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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/809,358	03/26/2004	Huey-Song You	YOUH001/EM	7577

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EXAMINER	
PRINCE, FRED G	

ART UNIT	PAPER NUMBER
1724	

DATE MAILED: 08/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/809,358	YOU ET AL.	
	Examiner	Art Unit	
	Fred Prince	1724	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *16-22* is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 2 is objected to because of the following informalities: In line 2, it appears that "seed" should be changed to "seeded". Appropriate correction is required.

2. Claim 8 is objected to because of the following informalities: In line 2, it appears that "tripper" should be changed to "stripper". Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 3-5, 11-13 rejected under 35 U.S.C. 102(a) as being anticipated by Daigger et al.

Daigger et al. teach an anaerobic bioreactor (30) capable of removing organic pollutants in wastewater through an anaerobic treatment process, an aerobic bioreactor (34) disposed rearwardly of said anaerobic bioreactor and capable of removing residual organic pollutants in the effluent of said anaerobic bioreactor through aerobic treatment process; and a membrane separation reactor (38) disposed rearwardly of said aerobic bioreactor and capable of separating solids from liquids in the effluent of said aerobic

bioreactor, wherein said aerobic bioreactor and said membrane reactor can further comprise a device (50, 60) for recycling microbes from said aerobic bioreactor or membrane separation reactor to said anaerobic bioreactor, wherein an air sparger (58) scours the membrane (abstract).

5. Claims 1, 3, 5-7, and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakamura et al. (JP P2001-58197).

Nakamura et al. teach an anaerobic bioreactor (1) containing anaerobes and facultative bacteria (page 6) capable of removing organic pollutants in wastewater through an anaerobic treatment process, an aerobic bioreactor (2) containing aerobes and facultative bacteria (page 6) disposed rearwardly of said anaerobic bioreactor and capable of removing residual organic pollutants in the effluent of said anaerobic bioreactor through aerobic treatment process; and a membrane separation reactor (4) disposed rearwardly of said aerobic bioreactor and capable of separating solids from liquids in the effluent of said aerobic bioreactor, wherein said aerobic bioreactor and said membrane reactor can further comprise a device (d, n') for recycling microbes from said aerobic bioreactor or membrane separation reactor to said anaerobic bioreactor.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 2, 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over either Daigger et al. or Nakamura et al.

Both references are described above. Neither reference discloses seeding the reactors with anaerobic sludge.

In any case, it is submitted that it is conventional in the art to provide anaerobic sludge to systems utilizing aerobic and anaerobic phases in order to, for example, provide bacteria when the influent is expected to have a high BOD or when bacteria requirements exceed the amount of recycle sludge available (see, for example, US Pat No 3,235,487 to Westgarth).

Accordingly, it would have been readily obvious for the skilled artisan to modify the system of either one of Daigger et al. or Nakamura et al. such that it includes seeding both bioreactor with anaerobic sludge in order to, for example, provide bacteria when the influent is expected to have a high BOD or when bacteria requirements exceed the amount of recycle sludge available, as known in the art.

Per claims 14 and 15, neither of the references discloses that the sparger can reduce the device or inorganic acid is added with the gas.

In it is submitted that it is well known in the art that aeration lowers the pH of wastewater and that inorganic acid also lowers pH, both elements being beneficial in order to, for example, enhance oxidation of organics in the water (see, for example, US Pat No 4,225,431 to De Longe).

Accordingly, it would have been readily obvious for the skilled artisan to have modified the system of either Daigger et al. or Nakamura et al. such that it includes a

sparger that lowers the pH of wastewater and means for adding an inorganic acid to lower pH in order to, for example, enhance oxidation of organics in the water, as known in the art.

Regarding the number of pH units by which the sparging device is capable of decreasing the water, it is submitted that the pH units are matter of routine optimization of a known process-effective variable, depending on the results desired and expected contaminant loading.

8. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over either Daigger et al. or Nakamura et al. in view of Khudenko (US 2003/0132160) taken together with Khudenko (US Pat No 5,798,043).

Both references are described above. Neither reference discloses stripping CO2 to increase pH of the water to precipitate crystals and inserting the crystals into the floc matrix of aerobes through bioflocculation.

Khudenko ('160) discloses stripping CO2 to precipitate crystals and inserting the crystals into the floc matrix of aerobes through bioflocculation in order to, for example, reduce fouling of a membrane (paragraph [0020]).

Khudenko ('043) teaches that stripping CO2 causes the pH of the water to rise while carbonates are precipitated (col. 5, lines 64-67).

Accordingly it would have been readily obvious for the skilled artisan to have modified the system of either Daigger et al. or Nakamura et al. such either includes stripping CO2 to increase pH of the water to precipitate crystals and inserting the crystals into the floc matrix of aerobes through bioflocculation in order to, for example,

reduce fouling of a membrane, as suggested by Khudenko ('160) taken together with Khudenko ('043).

9. Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over either Daigger et al. or Nakamura et al. in view of Karlsson (US Pat No 5,190,655).

Both references are described above. Neither reference discloses removing toxic inhibitors prior to the anaerobic vessel or utilizing alkaline hydrolysis.

In any case, Karlsson disclose utilizing an alkaline hydrolysis step prior to an anaerobic step in order to, for instance, convert "toxic inhibitors" in the form of organics to an easily digestible form and/or enhance denitrification of organics (col. 2, lines 47) .

Accordingly, it would have been readily obvious for the skilled artisan to modify the system of either one of Daigger et al. or Nakamura et al. such that it includes utilizing an alkaline hydrolysis step prior to an anaerobic step in order to, for instance, convert "toxic inhibitors" in the form of organics to an easily digestible form and/or enhance denitrification of organics, as suggested by Karlsson.

Allowable Subject Matter

10. Claims 16-22 are allowed.

11. The following is a statement of reasons for the indication of allowable subject matter: While it is known in the art to provide water to an anaerobic reactor, aerobic reactor, and membrane reactor (see Daigger et al. or Nakamura et al.), and it is known in the art to CO2 from the water to increase the pH of the water precipitate crystals

while inserting the crystals into the floc matrix of aerobes through bioflocculation (see, for example, the above-mentioned Khudenko references), in the examiner's opinion, the prior fails to teach or fairly suggest precipitating struvite in the above manner and inserting struvite into the floc matrix.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. References are cited of interest to show the state of the art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fred Prince whose telephone number is (571) 272-1165. The examiner can normally be reached on Monday-Thursday, 6:30-4:00; alt. Fridays 6:30-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on (571) 272-1166. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Fred Prince
Primary Examiner
Art Unit 1724

fgp
8/17/05